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B62K 21/22 21/16

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(58) Field of Search
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INT CL[6] B62K 21/12 21/14 21/16 21/18 21/20 21/22 21/24
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(54) Dual handlebars: adjustable inclination through ball and socket joints

(57) Dual handlebars 12 are clamped to forks 14 below a yoke 18. Each clamp 10 has an outer body, preferably of two parts 31, 32, partially surrounding an inner sleeve, preferably also of two parts 21, 22, which fits around a fork leg. The inner sleeve has a part-spherical outer bearing surface, enabling the outer clamp body to be freely adjusted to a wide range of angular positions when clamp bolts (not shown) are released. The sleeve and body together can also be moved up and down the fork and rotated thereon. Part 31 of the clamp body also carries means for clamping a handlebar. This may comprise a bush 35, which together with a co-operating clamp plate 40, defines a passageway 50 through which the handlebar locates and is clamped. The handlebar may be longitudinally adjustable in said clamp. Passageway 50 may communicate with the interior of the clamp body through an aperture in clamp part 31, which saves weight (figs. 6 to 8).

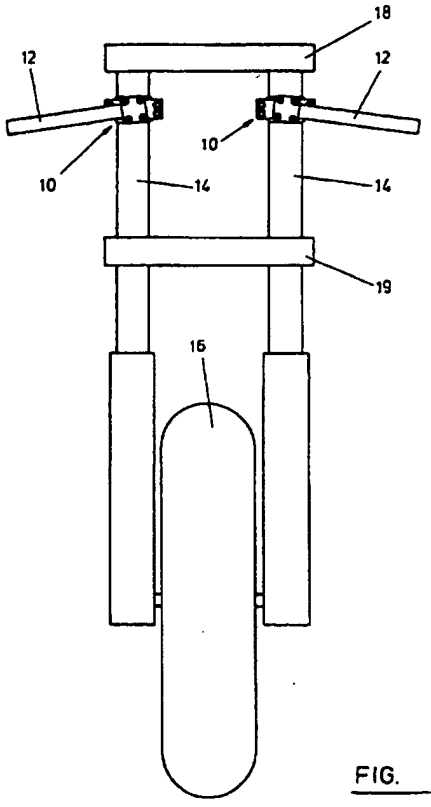

FIG. 1

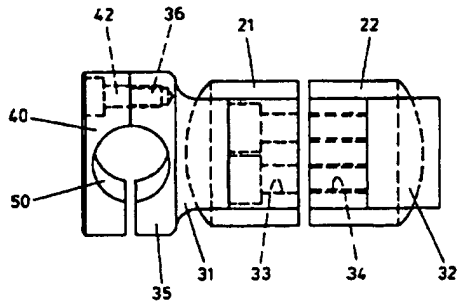

FIG. 3

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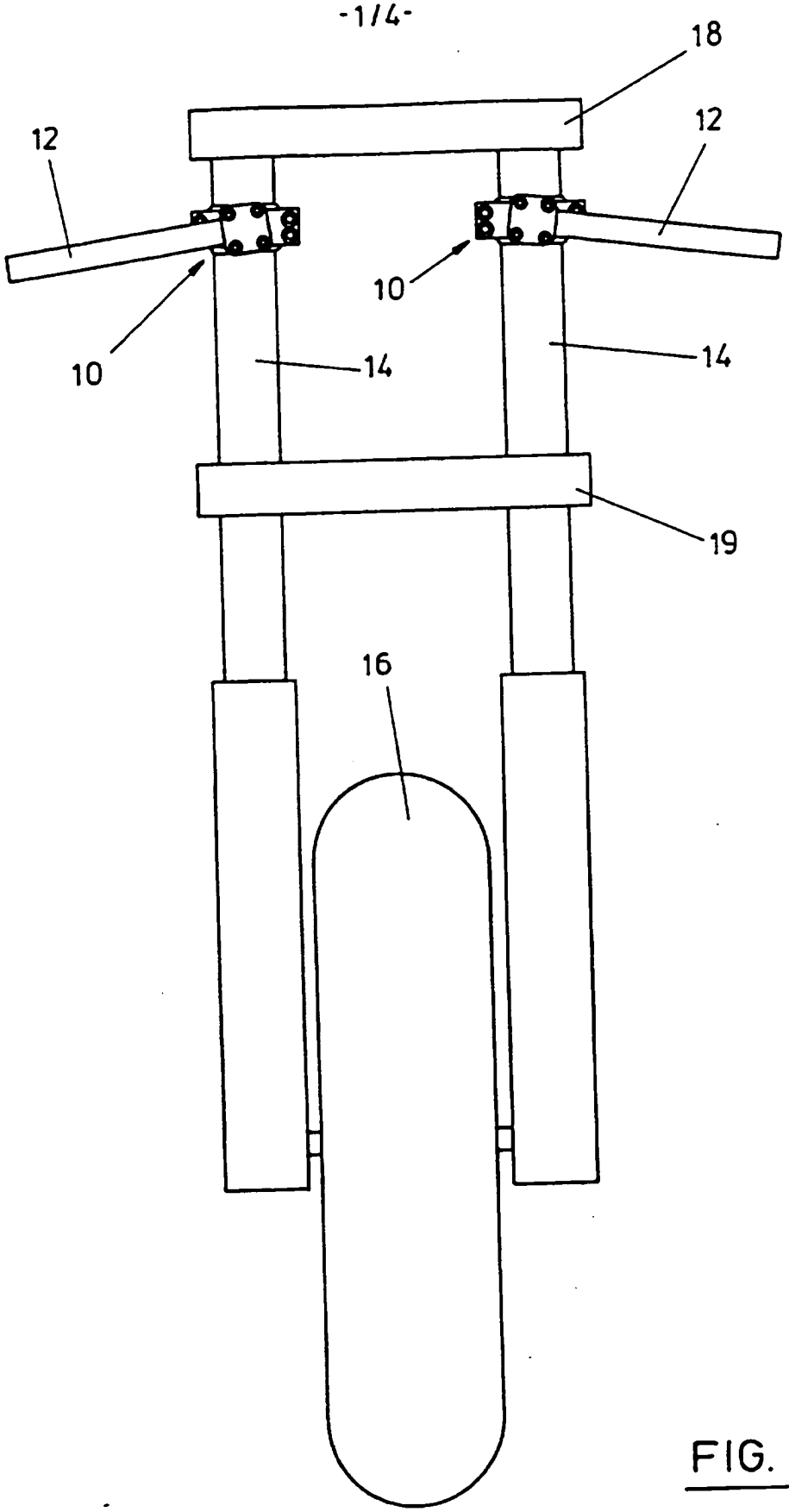

FIG. 1

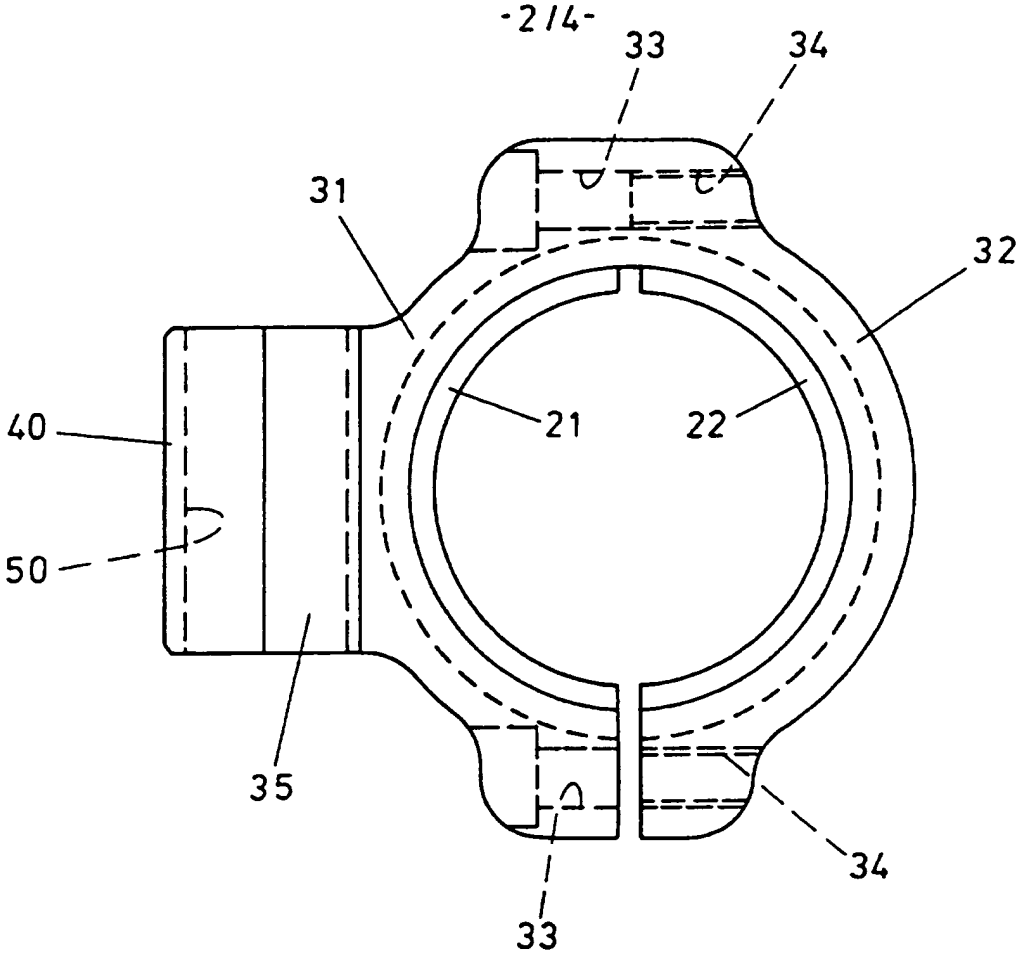

FIG. 2

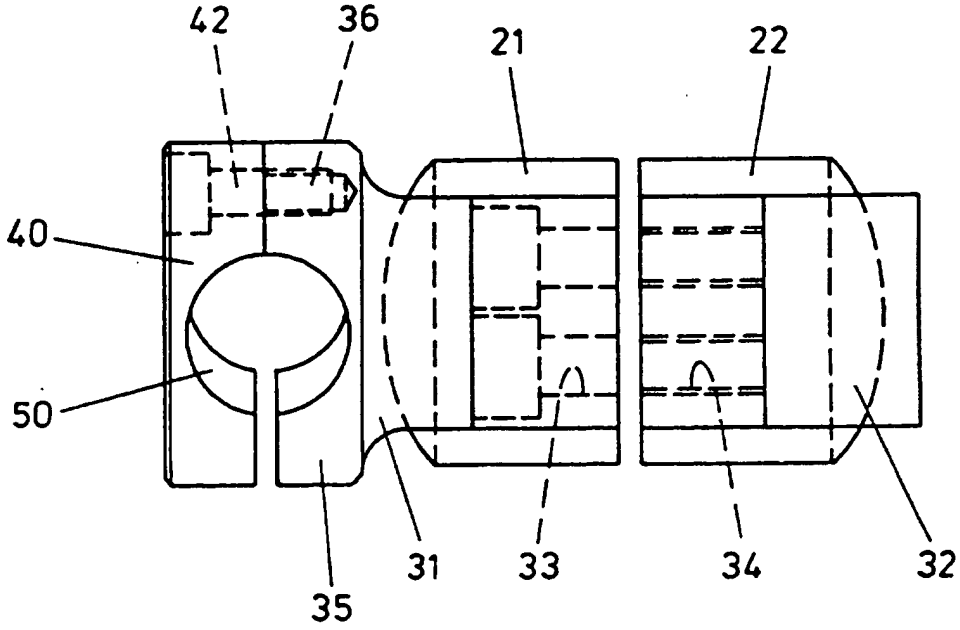

FIG. 3

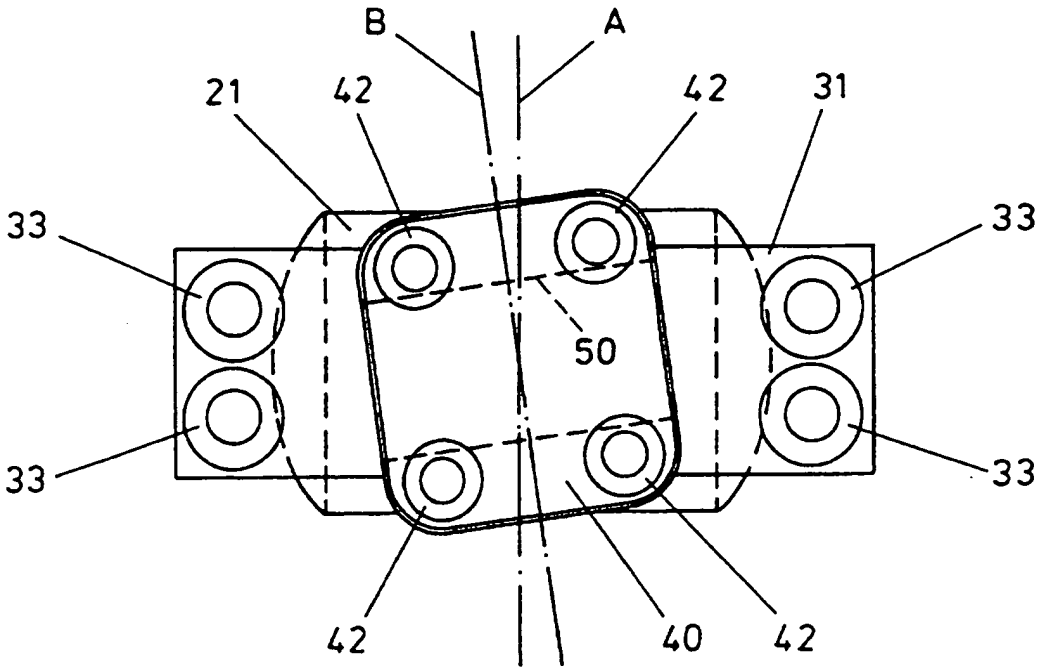
B
A
21
42
42
31
33
33
50
33
33
42
40
42

FIG. 4

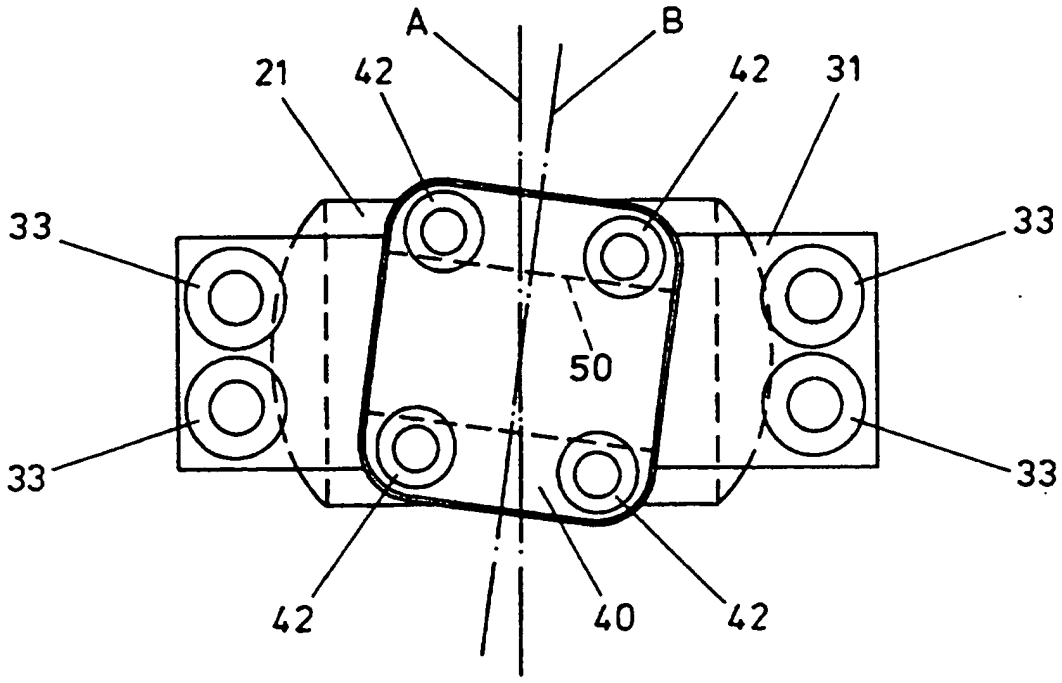
A
B
21
42
42
31
33
33
50
33
33
42
40
42

FIG. 5

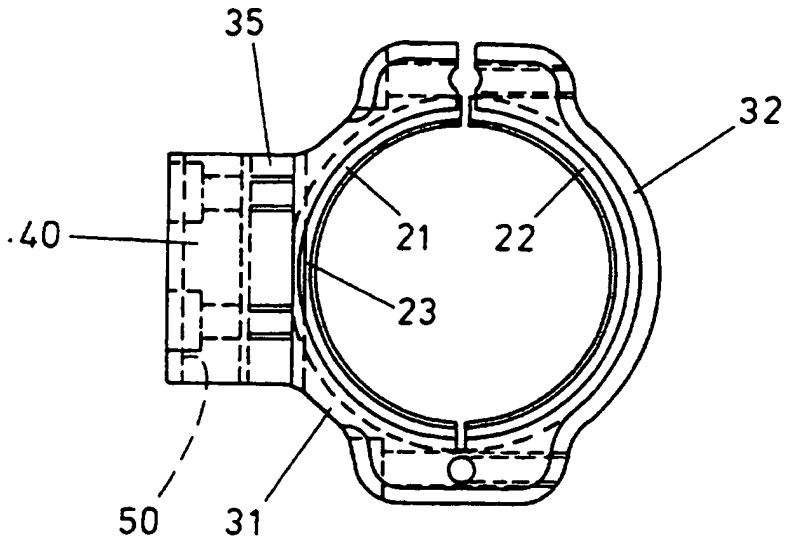

FIG. 6

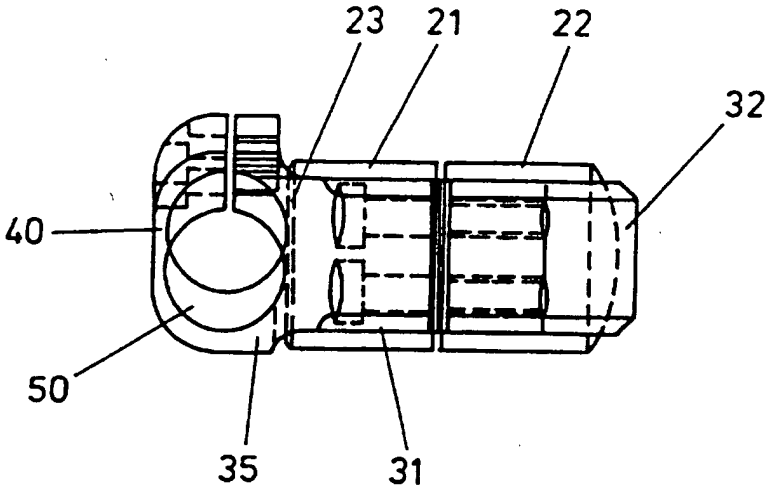

FIG. 7

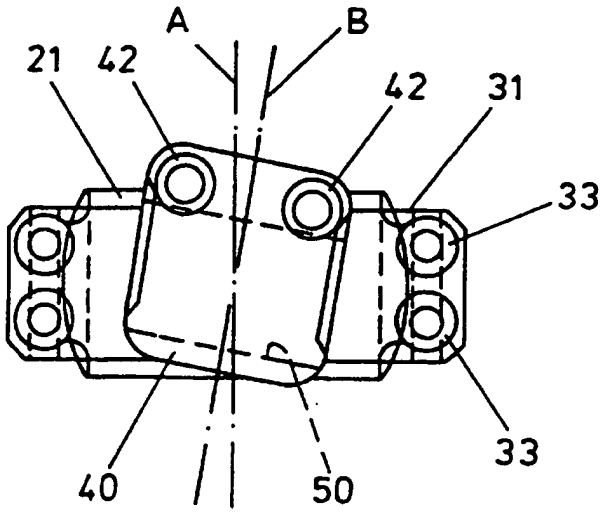

FIG. 8

Adjustable Clamp Assembly for a Handlebar

This invention concerns a motorcycle handlebar clamp assembly.

The handlebars of certain types of motorcycle, particularly those designed for road racing, are fabricated as two separate components and clamped onto respective forks at the front of the motorcycle.

A variety of clamping arrangements are known which enable the position of the handlebars to be adjusted to suit different race tracks, different road surfaces and different riders. Axial adjustment of the respective handlebars is provided for as well as rotational adjustment relative to the respective fork. Adjustment of the inclination of each handlebar, ie in a vertical plane, is also possible in some cases. In addition to this the position of attachment to the respective fork can be varied by sliding the clamping arrangement up or down the fork below a top yoke, which joins the forks together at the top, or positioning the clamping arrangement above the top yoke.

Clamping arrangements which allow adjustment of the inclination of each handlebar have, hitherto, included a pivotal connection between a portion for clamping the handlebar and a portion for clamping onto the fork. This connection must of course, be capable of being held fixedly once adjustment has taken place and a handlebar position selected. Such arrangements are mechanically complicated and

given the extreme conditions to which racing motorcycles are subjected, with enormous power and very high speeds (eg in excess of 250 km/hr) being commonplace, their ability to withstand the stresses to which they might be subjected may be suspect. Of course, failure of any such component has the potential to be fatal.

An object of the present invention is to provide a handlebar clamp assembly for motorcycles which allows a greater degree of adjustability than hitherto, but which also has optimum reliability as regards the durability of all parts thereof and their ability to retain their clamped position irrespective of enormous forces and impacts to which they may be subjected.

With this object in view, the present invention provides a motorcycle handlebar clamp assembly comprising an outer clamp body which partially surrounds an inner sleeve, the sleeve having an inner surface adapted to embrace the circumference of a motorcycle fork and a part spherical outer surface providing a bearing surface for the outer clamp body during adjustment of the latter, and fastening means whereby the outer clamp body may be rigidly clamped around the inner sleeve and the motorcycle fork, the outer clamp body also carrying means for clamping a motorcycle handlebar.

In use, with the fastening means released, the inner sleeve and outer clamp body together are able to be slid up and down the motorcycle fork and to be rotated upon the fork, in a manner comparable to known clamp assemblies. Uniquely, however, the outer clamp body (which, of course has a part-spherical interior surface) is able to move freely upon the part spherical outer surface of the inner sleeve to take up whatever angular disposition is desired relative to the motorcycle fork. The freedom of movement permitted to the clamp body is akin to that achieved with a ball and socket

joint but is more limited because the assembly is clamped around the motorcycle fork whereas a true ball and socket joint is generally located at the end of a shaft. In preferred embodiments the outer clamp body is capable of tilting through something in the region of 20° relative to the inner sleeve in all directions. This allows for a much wider range of adjustment of the handlebar position relative to the fork, as well as making such adjustment easier to accomplish, it being necessary only to release (and subsequently re-tighten) the one fastening means (usually a set of bolts).

Both the inner sleeve and the outer clamp body must have at least one split in order to allow on the one hand for their adjustment in the manner just described and, on the other hand, for their rigid clamping to the motorcycle fork.

Preferably both the inner sleeve and the outer clamp body are formed of two parts. This results in the most secure clamping, and minimizes any risk of failure in the respective components owing to stresses occasioned during such clamping. It also facilitates their fitment to motorcycle forks when this is required at a position below a top yoke which connects the two forks together.

It would be possible, however, and is within the scope of the present invention, for either of these components to be formed as a unitary element with a single split, or as two parts connected by a hinge, or from more than two parts.

For ease of manufacture, the inner sleeve is preferably formed of two parts which are substantially identical.

The means carried by one part of the clamp body for clamping the motorcycle handlebar will generally include an additional

clamp plate and fastening means for same. Release of these fastening means will allow axial adjustment of the handlebar.

In preferred embodiments of the present invention the means for clamping the motorcycle handlebar includes a passageway for location of the handlebar therethrough, said passageway extending at a fixed angle relative to a longitudinal axis through the outer clamp body. In this respect, the degree of adjustment afforded by the use of an inner sleeve with a part-spherical bearing surface obviates the need for any adjustability between the means for clamping the handlebar and the remainder of the clamp body which clamps around the motorcycle fork. This avoids any additional connection with the potential to fail.

In particularly advantageous embodiments, the bulk and weight of the boss is reduced by the passageway for the motorcycle handlebar communicating with the interior of the outer clamp body via an aperture in the latter. Furthermore, the inner sleeve preferably has a flattened outer surface portion facing the said aperture and whilst this inhibits relative rotation between the sleeve and the outer body, which has some advantage in keeping their gaps in register, in does not impair their relative adjustment in other planes.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a fragmentary schematic view of a front portion of a motorcycle, showing only the essential components, and illustrating the location of two clamp assemblies in accordance with the invention;

Figure 2 is a plan view of a first embodiment of the clamp assembly of the invention;

Figure 3 is a side elevation of the assembly of figure 2;

Figure 4 is a front view of an assembly as in figures 2 and 3 for attachment of a handlebar to the right hand side of a motorcycle;

Figure 5 is a corresponding front view of an assembly as in figure 2 and 3 for attachment of a handlebar to the left hand side of a motorcycle; and

Figure 6 is a plan view of a second embodiment of the clamp assembly of the invention;

Figure 7 is a side elevation of the assembly of Figure 6; and

Figure 8 is a front view of the assembly of Figure 6 for attachment of a handlebar to the left hand side of a motorcycle.

Referring firstly to figure 1, two clamp assemblies (10) in accordance with the invention are shown in their functional position clamping respective handlebars (12) to the pair of forks (14) extending upward from the front wheel (16) of a motorcycle. A top yoke (18) and bottom yoke (19) are also shown.

Referring now to the remaining drawings, the preferred embodiment of clamp assembly comprises a two part inner sleeve (21), (22), a two part outer clamp body (31), (32) a clamp plate (40) and two sets of bolts (not shown).

The two parts (21), (22) of the inner sleeve are substantially identical. Each has an inner surface which is just slightly less than semi-cylindrical so that together they fit around the circumference of a cylindrical portion of one of the

motorcycle forks, with a slight gap remaining therebetween at one place at least. In other words, it is not essential that two gaps should always exist and the parts (21), (22) may contact each other at one side. Each sleeve part (21), (22) also has a part-spherical outer surface.

The two parts (31, (32) of the outer clamp body each have a part-spherical inner surface matching the outer surface of the inner sleeve parts, so that they are capable of a close sliding fit over the latter, when the assembly is secured but the bolts are not fully tightened. Each part (31), (32) of the body includes flanges provided with respective bores (33), (34) through which the bolts of the first set engage. One part (31) has counterbored holes (33) for the heads of the bolts and the other part (32) has threaded bores (34). Suitably two bolts are provided at each side, but this may vary in different embodiments.

It is advantageous for both the inner sleeve (21), (22) and the outer clamp body (31), (32) to be formed in two parts. This allows the assembly to be readily mounted to the motorcycle fork (14) in the event that it is to be positioned below a top yoke (18) (see figure 1) which connects the forks (14) at or near their upper end. Equally important is the security and reliability of the clamp connection obtained with two such facing parts compared to an arrangement with a single split or a hinge connection between parts. When the first set of bolts are loosened the inner sleeve and outer body together can slide up and down on the fork (14) and rotate thereon and the outer body parts (31) (32) are freely adjustable on the bearing surface provided by the part spherical outer surface of the inner sleeve parts (21), (22). Once the desired position for the clamp body is achieved the bolts of the first set are tightened so as to rigidly clamp both the outer body and the inner sleeve to the fork (14).

One part (31) of the outer clamp body also includes a boss (35) which lies between the respective flanges for mating with the other part (32) of the body and which is approximately square in side view (see Figs 4 and 5) with bevelled corners. The clamp plate (40) is of corresponding shape to the boss (35) and each is formed with a substantially semi-cylindrical channel. When the plate (40) is secured to the boss (35) by means of a second set of bolts (not shown) these channels are aligned to define a cylindrical passageway (50) through which the tubular handlebar (12) may be located and in which it may be clamped. The bolts (not shown) project through aligned bores (42) and (36) in the clamp plate (40) and the boss (35) respectively. Again four bolts are shown in the illustrated embodiment, but this could vary in other versions. When the bolts are loosened the handlebar (12) can be adjusted in position in an axial direction. Once a desired position is selected the bolts will be tightened again to rigidly clamp the handlebar (12) to the body (31), (32).

In Figures 4 and 5 the inner sleeve (21), (22) and the outer clamp (31), (32) are shown in a concentric disposition and their longitudinal axis is shown at "A". The boss (35) is formed with its axis of symmetry "B" inclined at an angle of 8° to 9° to the aforesaid axis "A". The clamp plate (40) directly overlies the boss (35) and so is similarly arranged. The passageway (50) which is formed between these two then extends at an angle of about 81° to 82° to the axis "A" of the clamp body (31), (32). Obviously the clamp assemblies for the right and left handlebars need to be fabricated in symmetrical fashion and this is shown in figures 4 and 5.

In other embodiments the passageway (50) could be arranged to extend at a different angle, or even at right angles to the axis "A". The important thing is that whatever angle is chosen the boss (35) is fixed relative to and preferably

formed integrally with one part of the clamp body (31) since any additional connection at this point could lead to undesirable weakness in the overall assembly.

Figures 6 to 8 illustrated a preferred embodiment of the assembly of the invention which possesses several advantageous features compared to the embodiment shown in Figures 2 to 5.

Almost all of the foregoing description applies equally to this further embodiment and in addressing the skilled man it is not deemed necessary to repeat it all. The same reference numerals are used for corresponding parts and for the sake of brevity only the additional features will now be described.

In this embodiment, the boss (35) which, together with the clamp plate (40) provides the passageway (50) for reception of and clamping of the handlebar (12) (see fig 1), is of considerably reduced size. The passageway (50) for the handlebar (12) communicates with the interior of the outer clamp body (31, 32) via an aperture in the relevant part (31) of the body which carries the boss (35). In this respect, one side of the passageway (50) extends along a line which lies beyond a tangent to the inner surface of the outer clamp body, thereby cutting through to the interior of that body via the aforesaid aperture. At a corresponding position the outer surface of the relevant part (21) of the inner sleeve (21, 22) is flattened (at 23). Thus, with the handlebar (12) inserted through the passageway (50), it makes line contact with the flattened surface position of the inner sleeve part (21). This has the effect of substantially preventing relative rotation of the inner sleeve (21, 22) and the outer clamp body (31, 33), which in turn tends to keep the gaps between the parts (21 and 22) of the inner sleeve in register with the gaps between the parts (31 and 32) of the outer clamp body. This is useful in avoiding any tendency for uneven clamping

which might otherwise occur for example in the event that friction between the inner sleeve and outer body caused the gap to close at one side.

The line contact between the tubular handlebar (12) and the flattened portion (23) of the inner sleeve part (21) does not interfere in any other respect with the freedom of movement of the outer body about the inner sleeve when adjusting the handlebar disposition relative to the fork on which the inner sleeve is mounted. Rotation of the handlebar relative to the fork is achieved by rotation of the inner sleeve on the fork.

The reduction in the material of the boss (35), and particularly the provision of the aperture in the part (31) of the outer body, considerably reduces the weight of the assembly in this embodiment compared to that illustrated in Figures 2 to 5. Also, the closer proximity of the handlebar (12) to the axis of the fork and hence the axis of the clamp assembly reduces the leverage required to make adjustments of the clamp body relative to the inner sleeve and/or the fork.

Claims

1. A motorcycle handlebar clamp assembly comprising an outer clamp body which partially surrounds an inner sleeve, the sleeve having an inner surface adapted to embrace the circumference of a motorcycle fork and a part spherical outer surface providing a bearing surface for the outer clamp body during adjustment of the latter, and fastening means whereby the outer clamp body may be rigidly clamped around the inner sleeve and the motorcycle fork, the outer clamp body also carrying means for clamping a motorcycle handlebar.

2. A clamp assembly as claimed in claim 1 wherein the inner sleeve is formed in two parts, each part having a part cylindrical inner surface.

3. A clamp assembly as claimed in claim 2 wherein the two parts of the inner sleeve are substantially identical.

4. A clamp assembly as claimed in any preceding claim wherein the outer clamp body is formed of two parts.

5. A clamp assembly as claimed in any preceding claim wherein the means for clamping the motorcycle handlebar includes an additional clamp plate and fastening means for same.

6. A clamp assembly as claimed in any preceding claim wherein the means for clamping the motorcycle handlebar includes a passageway for location of the handlebar therethrough, said passageway extending at a fixed angle

relative to a longitudinal axis through the outer clamp body.

7. A clamp assembly as claimed in claim 6 wherein the passageway for the motorcycle handlebar extends at an acute angle to the longitudinal axis through the outer clamp body.

8. A clamp assembly as claimed in any preceding claim wherein the passageway for the motorcycle handlebar communicates with the interior of the clamp body via an aperture in the latter.

9. A clamp assembly as claimed in claim 8 wherein the inner sleeve has a flattened outer surface portion facing the said aperture.

10. A motorcycle handlebar clamp assembly substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

The Patent Office

12

Application No: GB 9603287.5 **Examiner:** Ken Strachan
Claims searched: All **Date of search:** 18 October 1996

Patents Act 1977

Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B7E: ESA, ESB, ESC, ESR, ESS;

Int Cl (Ed.6): B62K: 21/12, 21/14, 21/16, 21/18, 21/20, 21/22, 21/24;

Other: Online database: WPI.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 410,825 (Bleasdale) See figure 6; notice ball and socket joints between handlebars and stem.	
X	US 5,247,852 (Guerr) Whole document relevant.	1, at least.

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.